

PATENT ABSTRACTS OF JAPAN

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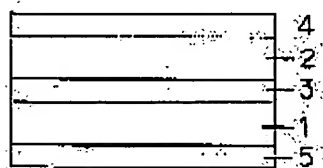
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(54) **HEAT TRANSFER SHEET**

(57)Abstract:

PURPOSE: To form a colored printed matter in which high luminance and metallic gloss having no problem in safety are obtained by forming a heat transfer ink layer containing an inorganic pearl content consisting of a natural mica surfaced with a metallic oxide at least on one surface of a base material sheet.

CONSTITUTION: This heat transfer sheet comprises a release layer 3 between a base material sheet 1 and a heat transfer ink layer 2, an adhesive layer 4 on the layer 2 and a back surface layer 5 on the rear surface of the sheet 1. As the layer 2, pearl pigment consisting of natural mica surfaced with a metallic oxide is formed. The pigment is so operated as to bring pearl gloss by the light reflected by using the difference of refractive indexes of them by covering the surface of the mica having low refractive index with the oxide having a high refractive index. As



the oxide, titanium oxide or iron oxide is preferably used. As the layer 4, colorant is contained.

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CLAIMS

[Claim(s)]

[Claim 1] The hot printing sheet characterized by forming in one [at least] field of a base material sheet the hot printing nature ink layer containing the inorganic pearl pigment which covered the front face of a natural mica with the metallic oxide.

[Claim 2] The hot printing sheet according to claim 1 characterized by the above-mentioned metallic oxides being titanium oxide and/or an iron oxide.

[Claim 3] The hot printing sheet according to claim 1 to 2 characterized by preparing a glue line on the above-mentioned hot printing nature ink layer.

[Claim 4] The hot printing sheet according to claim 3 characterized by the above-mentioned glue line containing a coloring agent.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the hot printing sheet which can obtain in more detail the printing object which has metallic luster simple using a thermal transfer printer about the hot printing sheet used for the thermal transfer printer which uses heating means, such as a thermal head and laser.

[0002]

[Description of the Prior Art] Conventionally, using the hot printing sheet which made base material sheets, such as plastic film, support the thermofusion ink layer which made binders, such as a wax of thermofusion nature, and resin, distribute color material, such as a pigment, the energy according to image information is impressed to heating devices, such as a thermal head, and the melting imprint method which imprints color material

with a binder in the transferred papers, such as paper and a sheet plastic, is learned (JP,57-105395,A). The image formed by the melting imprint method is excellent in high concentration at sharp nature, and fits record of binary images, such as an alphabetic character and a line drawing. Moreover, formation of multiple color or a color picture is also possible by recording in the transferred paper in piles using hot printing sheets, such as yellow, a Magenta, cyanogen, and black. Moreover, the demand of obtaining the printing object which has metallic luster using a melting imprint method simple is also increasing, and the thermal-transfer-recording medium which comes to prepare stratum disjunctum, a vacuum evaporatio support layer, a metal vacuum evaporatio layer, and a glue line in one field of a base material one by one is shown like JP,63-30288,A. moreover, the thermal-ink-transfer-printing material which comes to prepare the ink layer which made the thermofusion nature vehicle distribute metallic flake pigments, such as aluminum and bronze, on a base material like JP,63-290789,A apart from it -- presentation -- now, it is.

[0003]

[Problem(s) to be Solved by the Invention] However, in a configuration of having used the metal vacuum evaporatio layer, brightness can obtain the printing object which was highly excellent in visibility, but in order to obtain a vacuum evaporatio layer, a facility of a sputtering system etc. is required. Moreover, since there was no adhesive property in the vacuum evaporatio layer itself, the vacuum evaporatio support layer needed to be prepared like the conventional technique, and there was a problem that a production process became complicated as a whole. Moreover, when reproducing metallic luster by preparing the ink layer which made the thermofusion nature vehicle distribute the metal pigment made conventionally well-known and reproducing gold especially, it is necessary to make it the multilayer which prepared the coloring layer containing a yellow color or a yellow pigment on the ink layer which mixed the yellow color or the yellow pigment in the thermoplastics which distributed aluminum, or distributed aluminum in thermoplastics. Or although the ink layer which distributed bronze was generally used into thermoplastics, the former was inferior to metallic luster nature, and the latter had a problem in respect of the safety of bronze. a purpose [solve / this invention / the above troubles] -- carrying out -- a facility and vacuum evaporatio support layer of sputtering etc. -- unnecessary -- in addition -- and it aims at offering the hot printing sheet which can obtain the coloring printing object with which the metallic luster which is high brightness and does not have a problem in safety is acquired.

[0004]

[Means for Solving the Problem] In order to attain the above-mentioned purpose, this invention was considered as the configuration of the hot printing sheet characterized by forming in one [at least] field of a base material sheet the hot printing nature ink layer containing the inorganic pearl pigment which covered the front face of a natural mica with the metallic oxide. Moreover, it is characterized by the above-mentioned metallic oxides being titanium oxide and/or an iron oxide. Furthermore, it is characterized by preparing the glue line which raises the acceptance nature to television paper on the above-mentioned hot printing nature ink layer. It is characterized by the above-mentioned glue line containing a coloring agent.

[0005]

[Function] This invention brings about pearl gloss with the light reflected on each

boundary using the difference of these refractive indexes by containing the inorganic pearl pigment which covered the front face of a natural mica with a low refractive index with the metallic oxide with a high refractive index in a hot printing nature ink layer. Moreover, when metallic oxides are titanium oxide and/or an iron oxide, pearl gloss and colorization are united and it becomes a metal color tone. By preparing a glue line on the above-mentioned hot printing nature ink layer, the adhesive property to television paper improves and a good imprint is performed. Furthermore, when this glue line contains a coloring agent, various metallic luster colors are reproducible.

[0006]

[Best Mode of Carrying Out the Invention] The hot printing sheet of this invention is explained based on a drawing. Drawing 1 is drawing having shown the cross section of the hot printing sheet of this invention, 1 shows a base material sheet and 2 shows the hot printing nature ink layer. Drawing 2 is drawing having shown the cross section of the application of the hot printing sheet of this invention, forms a glue line 4 on stratum disjunctum 3 and the hot printing nature ink layer 2 between the base material sheet 1 and the hot printing nature ink layer 2, and forms the tooth-back layer 5 in the rear face of the base material sheet 1 further.

[0007] What the base material sheet used for the conventional hot printing sheet can be used as it is as a base material sheet 1, and there are specifically papers, such as plastics, such as polyester film, polypropylene, cellophane, a polycarbonate, cellulose acetate, polyethylene, polyvinyl chloride polystyrene, nylon, polyimide, a polyvinylidene chloride, polyvinyl alcohol, a fluororesin, chlorinated rubber, and an ionomer, a condenser paper, and paraffin paper, a nonwoven fabric, etc., and compounded these may be used. Although the thickness of a base material sheet can be changed according to an ingredient so that the reinforcement and thermal conductivity may become suitable, it is 2-25 micrometers preferably. Moreover, it is also possible to prepare a heat-resistant slip layer in the side and the opposite side in which the imprint layer of a base material sheet is prepared in order to prevent welding with a thermal head and to improve slipping nature.

[0008] The hot printing nature ink layer prepared on the above-mentioned base material sheet can mix a wax, resin, etc. which are characterized by containing the pearl pigment which covered the front face of a natural mica with the metallic oxide, in addition are used for the conventional thermofusion nature ink layer. Furthermore, although it is also possible to contain metallic flake pigments, such as aluminum, since a good feeling of metallic luster is obtained, it is more desirable not to use it, since a color pigment reduces a feeling of metallic luster. In the inorganic pearl pigment used by this invention, the light which reflected the front face of a natural mica with a low refractive index by being covered with the metallic oxide with a high refractive index using the difference of these refractive indexes brings about pearl gloss. As for a metallic oxide, titanium oxide and an iron oxide are preferably used from the glossiness and a refractive index. as a wax -- a micro crystallin wax, carnauba wax, paraffin wax, the Fischer Tropsch wax, various low molecular weight polyethylene, haze wax, yellow bees wax, spermaceti wax, IBOTAROU, a wool low, a shellac wax, a candelilla wax, and a PETORO lactam part -- various waxes, such as a denaturation wax, fatty acid ester, and a fatty-acid amide, are mentioned.

[0009] As resin, thermoplastic elastomer, such as polyester system resin, polyamide

system resin, polyolefine system resin, acrylic resin, styrene resin, an ethylene vinyl acetate copolymer, and styrene-butadiene rubber, is mentioned.

[0010] As for the above-mentioned hot printing nature ink layer constituent, it is desirable to mix at a rate of 10 - 90 % of the weight of inorganic pearl pigments, 90 - 10 % of the weight of resin, and 0 - 50 % of the weight of waxes. When there are few inorganic pearl pigments than the above-mentioned range, desired metallic luster cannot be reproduced and the definition at the time of printing falls. When [than the above-mentioned range] more, it is not desirable at the point that the film reinforcement of an imprint ink layer falls. When there is less resin than the above-mentioned range, it is not desirable at the point that film reinforcement falls like the above. When [than the above-mentioned range] more, it is not desirable in respect of the fall of a metal color tone and a feeling of gloss, and the fall of the definition at the time of printing. When there are more waxes than the above-mentioned range, desired metallic luster cannot be reproduced like the above. Formation of a hot printing nature ink layer forms a hot printing nature ink layer with a thickness of 0.1-20 micrometers using the above-mentioned hot printing nature ink layer constituent by a hot melt coat, a hot lacquer coat, a gravure direct coat, the gravure reverse coat, the knife coat, the air coat, and the roll coat method. In the case of thickness 0.1 micrometers or less, a good metal color tone and metallic luster are not acquired. In the case of thickness 20 micrometers or more, since the imprint sensibility at the time of printing falls, it is not desirable.

[0011] In addition, stratum disjunctum can be formed between a base material sheet and a hot printing nature ink layer. Since stratum disjunctum makes a wax a subject and raises adhesion with a base material sheet, it can also add a part of above thermoplastic elastomer, polyolefine system resin, polyester system resin, etc. Formation of stratum disjunctum forms stratum disjunctum with a thickness of 0.05-5 micrometers using the above-mentioned stratum disjunctum constituent by a hot melt coat, a hot lacquer coat, a gravure direct coat, the gravure reverse coat, the knife coat, the air coat, and the roll coat method. In the case of thickness 0.05 micrometers or less, the adhesive property of a base material sheet and a hot printing nature ink layer improves, and the good exfoliation effectiveness is not acquired. In the case of thickness 5 micrometers or more, since the imprint sensibility at the time of printing falls, it is not desirable.

[0012] Moreover, an adhesive property with television paper can be raised by forming a glue line on a hot printing nature ink layer. Although which conventionally well-known adhesives are sufficient as a glue line, desirable adhesives have the desirable thing which the minimum membrane formation temperature made distribute the thermoplastics particle 50-100 degrees C and whose particle size are 0.1-10 micrometers in a thermofusion nature wax. By distributing a particle in a wax, in the case of printing, only the part forms membranes, and it imprints, consequently there is an advantage that the definition of an alphabetic character improves. When the minimum membrane formation temperature is 50 degrees C or less, the shelf life as a product falls. When the minimum membrane formation temperature is 100 degrees C or more, in case it is an imprint, excessive energy is needed, and the problem that printing sensibility falls arises. Moreover, when particle size uses a thing 0.1 micrometers or less, it cannot respond to various television papers. When particle size uses a thing 10 micrometers or more, the problem of printing energy shortage arises like the above-mentioned. Here, as a thermoplastics particle, PORIARE fin system resin, such as an ethylene vinyl acetate

copolymer and an ethylene acrylic-acid copolymer, etc. is preferably used in that it has the optimal membrane formation temperature. The above-mentioned waxes are used as a thermofusion nature wax. These mixing ratios are mixed to 100 % of the weight of waxes at a rate of 10 - 100 % of the weight of thermoplastics particles. When there are few thermoplastics particles than 10 % of the weight, they are inferior to an adhesive property with television paper. When [than 100 % of the weight] more, the film reinforcement of a glue line falls. Formation of a glue line forms a glue line with a thickness of 0.1-10 micrometers using the above-mentioned ingredient by carrying out coating on a base material sheet with the coating method of a hot melt coat, a hot lacquer coat, a roll coat, a gravure coat, a gravure reverse coat, a knife coat, etc. In the case of thickness 0.1 micrometers or less of a glue line, good adhesion cannot be performed to various television papers. In the case of thickness 10 micrometers or more, printing sensibility falls like the above-mentioned.

[0013] Furthermore, in accordance with said hot printing nature ink layer, various gloss colors are reproducible by containing a coloring agent in the above-mentioned glue line. For example, when a black glue line is prepared in the lower layer (the lower layer in a printing condition is said) of the inorganic pearl pigment which covered the front face of a natural mica with ferrous oxide and titanium oxide, the printing object becomes golden, and when a blue glue line is prepared, the printing object becomes silver. As for the content of a coloring agent, it is desirable to mix at 1 - 50% of the weight of a rate among the AUW of the above-mentioned glue line constituent. When there are few contents of a coloring agent than 1 % of the weight, good various metallic luster colors are not obtained. When [than 50 % of the weight] more, since an adhesive property with television paper falls, it is not desirable.

[0014]

[Example] Next, an example and the example of a comparison are given and this invention is explained still more concretely. In addition, as long as there is no notice especially, there are weight criteria among a sentence with the section or %.

To the front face of polyester film (the Toray Industries make, lumiler) with a thickness [in which the heat-resistant slip layer was formed at example 1 tooth back] of 6.0 micrometers, solid content coverage is the following thermofusion nature ink constituent 3.0g/m² It applied by the bar coating machine so that it might become, and it dried at 80 degrees C, the hot printing nature ink layer was formed, and the hot printing sheet of this invention was obtained.

Hot printing nature ink constituent The inorganic pearl pigment (Iriodin 300 Merck Japan, Inc.) 40 section Polyester resin (Tg67 degree C) The ten sections MEK/toluene (1:1) The 50 sections [0015] On the hot printing nature ink layer of example 2 example 1, solid content coverage is the following glue line constituent 1.0 g/m² It applied by the bar coating machine so that it might become, and the hot printing sheet of this invention was obtained like the example 1 except having dried at 65 degrees C and having formed the glue line.

Glue line constituent EVA particle emulsion (particle size of 6 micrometers, the minimum membrane formation temperature of 70 degrees C) The ten sections Carnauba wax emulsion The 40 sections IPA/water (3/1) The 50 sections [0016] Between the example 3 above-mentioned polyester film and a hot printing nature ink layer, solid content coverage is the following stratum disjunctum constituent 0.5g/m² It applied by

the bar coating machine so that it might become, and the hot printing sheet of this invention was obtained like the example 2 except having dried at 65 degrees C and having formed stratum disjunctum. Stratum disjunctum constituent Carnauba wax emulsion The 20 sections IPA/water (3/1) The 80 sections [0017] The hot printing sheet of this invention was obtained like the example 2 except having changed the example 4 glue-line constituent into the following glue line constituent.

Glue line constituent Carbon black dispersion The ten sections EVA particle emulsion (particle size of 6 micrometers, the minimum membrane formation temperature of 70 degrees C) The ten sections Carnauba wax emulsion The 40 sections IPA/water (3/1) The 40 sections [0018] The hot printing sheet of this invention was obtained like the example 3 except having changed example 5 stratum disjunctum, the hot printing nature ink layer constituent, and the glue line constituent into following each ink constituent, respectively. Stratum disjunctum constituent Paraffin wax dispersion The 50 sections Styrene butadiene latex (Tg0 degree C) The five sections IPA/water (2/1) 45 section hot printing nature ink constituent The inorganic pearl pigment (Iriodin 323 Merck Japan, Inc.) 80 section Polyester resin (Tg20 degree C) The 20 sections MEK/toluene 100 section glue line constituent Ethylene acrylic-acid-resin particle dispersion The 30 section Carnauba wax emulsion The 30 sections IPA/water (1/1) The 40 sections [0019] The hot printing sheet of this invention was obtained like the example 4 except having changed the glue line constituent of example 6 example 4 into the following glue line constituent.

Glue line constituent alpha mold copper-phthalocyanine-blue pigment dispersion liquid The 15 sections EVA particle emulsion (particle size of 7 micrometers, the minimum membrane formation temperature of 70 degrees C) The ten sections Carnauba wax emulsion The 40 sections IPA/water (3/1) The 35 sections [0020] The comparative hot printing sheet was obtained like the example 1 except having changed the example of comparison 1 hot-printing nature ink layer constituent into the following hot printing nature ink layer constituent.

Hot printing nature ink layer constituent Bronze The 70 sections Polyester resin (Tg67 degree C) The 30 sections MEK/toluene The 100 sections [0021] The comparative hot printing sheet was obtained like the example 2 except having changed the example of comparison 2 hot-printing nature ink layer constituent into the following hot printing nature ink layer constituent.

Hot printing nature ink layer constituent Bronze The 70 sections Polyester resin (Tg67 degree C) The 30 sections MEK/toluene The 100 sections [0022] The comparative hot printing sheet was obtained like the example 3 except having changed the example of comparison 3 hot-printing nature ink layer constituent into the following hot printing nature ink layer constituent.

Hot printing nature ink layer constituent Bronze The 70 sections Polyester resin (Tg67 degree C) The 30 sections MEK/toluene The 100 sections [0023] To the front face of polyester film (the Toray Industries make, lumiler) with a thickness [in which the heat-resistant slip layer was formed at example of comparison 4 tooth back] of 6.0 micrometers, solid content coverage is the following stratum disjunctum constituent and a vacuum evaporatio support layer constituent, respectively 1.0g/m², and 0.2 g/m² It applied by the bar coating machine so that it might become, and after drying at 80 degrees C and forming stratum disjunctum and a vacuum evaporatio support layer, the metal vacuum evaporatio layer which consists of aluminum with a thickness of 600A

with a vacuum deposition method was formed. Solid content coverage is the following glue line constituent on this metal vacuum evaporatio layer 2.0 g/m² It applied by the bar coating machine so that it might become, and it dried at 80 degrees C, the glue line was formed, and the comparative hot printing sheet was obtained.

Stratum disjunctum constituent Carnauba wax The 95 sections Styrene-butadiene rubber 5 section vacuum evaporatio support layer constituent Chlorination polypropylene The ten sections MEK/toluene 90 section glue line constituent EVA particle emulsion (particle size of 7 micrometers, the minimum membrane formation temperature of 70 degrees C) The ten sections Carnauba wax emulsion The 40 sections IPA/water (3/1) The 50 sections [0024] The comparative hot printing sheet was obtained like the example 4 of a comparison except having changed the example of comparison 5 vacuum-evaporatio support layer constituent into the following vacuum evaporatio support layer constituent.

Vacuum evaporatio support layer constituent Chlorination polypropylene The nine sections Yellow color The one section MEK/toluene The 90 sections [0025] In the evaluator which carried out the printing condition prototype, it printed using the thin film thermal head of 200dpi under the conditions of printing pressure [of 4kg] / 200mm width-of-face, and printing speed 10 mm/sec.

[0026]

[Table 1]

[0027]

[Effect of the Invention] according to the hot printing sheet of this invention -- a facility and vacuum evaporatio support layer of sputtering etc. -- unnecessary -- in addition -- and the coloring printing object with which the metallic luster which does not have a problem in safety is acquired by high brightness can be obtained.

TECHNICAL FIELD

[Industrial Application] This invention relates to the hot printing sheet which can obtain in more detail the printing object which has metallic luster simple using a thermal transfer printer about the hot printing sheet used for the thermal transfer printer which uses heating means, such as a thermal head and laser.

PRIOR ART

[Description of the Prior Art] Conventionally, using the hot printing sheet which made base material sheets, such as plastic film, support the thermofusion ink layer which made binders, such as a wax of thermofusion nature, and resin, distribute color material, such as a pigment, the energy according to image information is impressed to heating devices, such as a thermal head, and the melting imprint method which imprints color material with a binder in the transferred papers, such as paper and a sheet plastic, is learned (JP,57-105395,A). The image formed by the melting imprint method is excellent in high concentration at sharp nature, and fits record of binary images, such as an alphabetic

character and a line drawing. Moreover, formation of multiple color or a color picture is also possible by recording in the transferred paper in piles using hot printing sheets, such as yellow, a Magenta, cyanogen, and black. Moreover, the demand of obtaining the printing object which has metallic luster using a melting imprint method simple is also increasing, and the thermal-transfer-recording medium which comes to prepare stratum disjunctum, a vacuum evaporatio support layer, a metal vacuum evaporatio layer, and a glue line in one field of a base material one by one is shown like JP,63-30288,A. moreover, the thermal-ink-transfer-printing material which comes to prepare the ink layer which made the thermofusion nature vehicle distribute metallic flake pigments, such as aluminum and bronze, on a base material like JP,63-290789,A apart from it -- presentation -- now, it is.

EFFECT OF THE INVENTION

[Effect of the Invention] according to the hot printing sheet of this invention -- a facility and vacuum evaporatio support layer of sputtering etc. -- unnecessary -- in addition -- and the coloring printing object with which the metallic luster which does not have a problem in safety is acquired by high brightness can be obtained.

TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] However, in a configuration of having used the metal vacuum evaporatio layer, brightness can obtain the printing object which was highly excellent in visibility, but in order to obtain a vacuum evaporatio layer, a facility of a sputtering system etc. is required. Moreover, since there was no adhesive property in the vacuum evaporatio layer itself, the vacuum evaporatio support layer needed to be prepared like the conventional technique, and there was a problem that a production process became complicated as a whole. Moreover, when reproducing metallic luster by preparing the ink layer which made the thermofusion nature vehicle distribute the metal pigment made conventionally well-known and reproducing gold especially, it is necessary to make it the multilayer which prepared the coloring layer containing a yellow color or a yellow pigment on the ink layer which mixed the yellow color or the yellow pigment in the thermoplastics which distributed aluminum, or distributed aluminum in thermoplastics. Or although the ink layer which distributed bronze was generally used into thermoplastics, the former was inferior to metallic luster nature, and the latter had a problem in respect of the safety of bronze. a purpose [solve / this invention / the above troubles] -- carrying out -- a facility and vacuum evaporatio support layer of sputtering etc. -- unnecessary -- in addition -- and it aims at offering the hot printing sheet which can obtain the coloring printing object with which the metallic luster which is high brightness and does not have a problem in safety is acquired.

MEANS

[Means for Solving the Problem] In order to attain the above-mentioned purpose, this invention was considered as the configuration of the hot printing sheet characterized by forming in one [at least] field of a base material sheet the hot printing nature ink layer containing the inorganic pearl pigment which covered the front face of a natural mica with the metallic oxide. Moreover, it is characterized by the above-mentioned metallic oxides being titanium oxide and/or an iron oxide. Furthermore, it is characterized by preparing the glue line which raises the acceptance nature to television paper on the above-mentioned hot printing nature ink layer. It is characterized by the above-mentioned glue line containing a coloring agent.

OPERATION

[Function] This invention brings about pearl gloss with the light reflected on each boundary using the difference of these refractive indexes by containing the inorganic pearl pigment which covered the front face of a natural mica with a low refractive index with the metallic oxide with a high refractive index in a hot printing nature ink layer. Moreover, when metallic oxides are titanium oxide and/or an iron oxide, pearl gloss and colorization are united and it becomes a metal color tone. By preparing a glue line on the above-mentioned hot printing nature ink layer, the adhesive property to television paper improves and a good imprint is performed. Furthermore, when this glue line contains a coloring agent, various metallic luster colors are reproducible.

[0006]

[Best Mode of Carrying Out the Invention] The hot printing sheet of this invention is explained based on a drawing. Drawing 1 is drawing having shown the cross section of the hot printing sheet of this invention, 1 shows a base material sheet and 2 shows the hot printing nature ink layer. Drawing 2 is drawing having shown the cross section of the application of the hot printing sheet of this invention, forms a glue line 4 on stratum disjunctum 3 and the hot printing nature ink layer 2 between the base material sheet 1 and the hot printing nature ink layer 2, and forms the tooth-back layer 5 in the rear face of the base material sheet 1 further.

[0007] What the base material sheet used for the conventional hot printing sheet can be used as it is as a base material sheet 1, and there are specifically papers, such as plastics, such as polyester film, polypropylene, cellophane, a polycarbonate, cellulose acetate, polyethylene, polyvinyl chloride polystyrene, nylon, polyimide, a polyvinylidene chloride, polyvinyl alcohol, a fluoro-resin, chlorinated rubber, and an ionomer, a condenser paper, and paraffin paper, a nonwoven fabric, etc., and compounded these may be used. Although the thickness of a base material sheet can be changed according to an ingredient so that the reinforcement and thermal conductivity may become suitable, it is 2-25 micrometers preferably. Moreover, it is also possible to prepare a heat-resistant slip layer in the side and the opposite side in which the imprint layer of a base material sheet is prepared in order to prevent welding with a thermal head and to improve slipping nature.

[0008] The hot printing nature ink layer prepared on the above-mentioned base material sheet can mix a wax, resin, etc. which are characterized by containing the pearl pigment

which covered the front face of a natural mica with the metallic oxide, in addition are used for the conventional thermofusion nature ink layer. Furthermore, although it is also possible to contain metallic flake pigments, such as aluminum, since a good feeling of metallic luster is obtained, it is more desirable not to use it, since a color pigment reduces a feeling of metallic luster. In the inorganic pearl pigment used by this invention, the light which reflected the front face of a natural mica with a low refractive index by being covered with the metallic oxide with a high refractive index using the difference of these refractive indexes brings about pearl gloss. As for a metallic oxide, titanium oxide and an iron oxide are preferably used from the glossiness and a refractive index. as a wax -- a micro crystallin wax, carnauba wax, paraffin wax, the Fischer Tropsch wax, various low molecular weight polyethylene, haze wax, yellow bees wax, spermaceti wax, IBOTAROU, a wool low, a shellac wax, a candelilla wax, and a PETORO lactam part -- various waxes, such as a denaturation wax, fatty acid ester, and a fatty-acid amide, are mentioned.

[0009] As resin, thermoplastic elastomer, such as polyester system resin, polyamide system resin, polyolefine system resin, acrylic resin, styrene resin, an ethylene vinyl acetate copolymer, and styrene-butadiene rubber, is mentioned.

[0010] As for the above-mentioned hot printing nature ink layer constituent, it is desirable to mix at a rate of 10 - 90 % of the weight of inorganic pearl pigments, 90 - 10 % of the weight of resin, and 0 - 50 % of the weight of waxes. When there are few inorganic pearl pigments than the above-mentioned range, desired metallic luster cannot be reproduced and the definition at the time of printing falls. When [than the above-mentioned range] more, it is not desirable at the point that the film reinforcement of an imprint ink layer falls. When there is less resin than the above-mentioned range, it is not desirable at the point that film reinforcement falls like the above. When [than the above-mentioned range] more, it is not desirable in respect of the fall of a metal color tone and a feeling of gloss, and the fall of the definition at the time of printing. When there are more waxes than the above-mentioned range, desired metallic luster cannot be reproduced like the above. Formation of a hot printing nature ink layer forms a hot printing nature ink layer with a thickness of 0.1-20 micrometers using the above-mentioned hot printing nature ink layer constituent by a hot melt coat, a hot lacquer coat, a gravure direct coat, the gravure reverse coat, the knife coat, the air coat, and the roll coat method. In the case of thickness 0.1 micrometers or less, a good metal color tone and metallic luster are not acquired. In the case of thickness 20 micrometers or more, since the imprint sensibility at the time of printing falls, it is not desirable.

[0011] In addition, stratum disjunctum can be formed between a base material sheet and a hot printing nature ink layer. Since stratum disjunctum makes a wax a subject and raises adhesion with a base material sheet, it can also add a part of above thermoplastic elastomer, polyolefine system resin, polyester system resin, etc. Formation of stratum disjunctum forms stratum disjunctum with a thickness of 0.05-5 micrometers using the above-mentioned stratum disjunctum constituent by a hot melt coat, a hot lacquer coat, a gravure direct coat, the gravure reverse coat, the knife coat, the air coat, and the roll coat method. In the case of thickness 0.05 micrometers or less, the adhesive property of a base material sheet and a hot printing nature ink layer improves, and the good exfoliation effectiveness is not acquired. In the case of thickness 5 micrometers or more, since the imprint sensibility at the time of printing falls, it is not desirable.

[0012] Moreover, an adhesive property with television paper can be raised by forming a glue line on a hot printing nature ink layer. Although which conventionally well-known adhesives are sufficient as a glue line, desirable adhesives have the desirable thing which the minimum membrane formation temperature made distribute the thermoplastics particle 50-100 degrees C and whose particle size are 0.1-10 micrometers in a thermofusion nature wax. By distributing a particle in a wax, in the case of printing, only the part forms membranes, and it imprints, consequently there is an advantage that the definition of an alphabetic character improves. When the minimum membrane formation temperature is 50 degrees C or less, the shelf life as a product falls. When the minimum membrane formation temperature is 100 degrees C or more, in case it is an imprint, excessive energy is needed, and the problem that printing sensibility falls arises. Moreover, when particle size uses a thing 0.1 micrometers or less, it cannot respond to various television papers. When particle size uses a thing 10 micrometers or more, the problem of printing energy shortage arises like the above-mentioned. Here, as a thermoplastics particle, PORIARE fin system resin, such as an ethylene vinyl acetate copolymer and an ethylene acrylic-acid copolymer, etc. is preferably used in that it has the optimal membrane formation temperature. The above-mentioned waxes are used as a thermofusion nature wax. These mixing ratios are mixed to 100 % of the weight of waxes at a rate of 10 - 100 % of the weight of thermoplastics particles. When there are few thermoplastics particles than 10 % of the weight, they are inferior to an adhesive property with television paper. When [than 100 % of the weight] more, the film reinforcement of a glue line falls. Formation of a glue line forms a glue line with a thickness of 0.1-10 micrometers using the above-mentioned ingredient by carrying out coating on a base material sheet with the coating method of a hot melt coat, a hot lacquer coat, a roll coat, a gravure coat, a gravure reverse coat, a knife coat, etc. In the case of thickness 0.1 micrometers or less of a glue line, good adhesion cannot be performed to various television papers. In the case of thickness 10 micrometers or more, printing sensibility falls like the above-mentioned.

[0013] Furthermore, in accordance with said hot printing nature ink layer, various gloss colors are reproducible by containing a coloring agent in the above-mentioned glue line. For example, when a black glue line is prepared in the lower layer (the lower layer in a printing condition is said) of the inorganic pearl pigment which covered the front face of a natural mica with ferrous oxide and titanium oxide, the printing object becomes golden, and when a blue glue line is prepared, the printing object becomes silver. As for the content of a coloring agent, it is desirable to mix at 1 - 50% of the weight of a rate among the AUW of the above-mentioned glue line constituent. When there are few contents of a coloring agent than 1 % of the weight, good various metallic luster colors are not obtained. When [than 50 % of the weight] more, since an adhesive property with television paper falls, it is not desirable.

EXAMPLE

[Example] Next, an example and the example of a comparison are given and this invention is explained still more concretely. In addition, as long as there is no notice especially, there are weight criteria among a sentence with the section or %.

To the front face of polyester film (the Toray Industries make, lumiler) with a thickness [in which the heat-resistant slip layer was formed at example 1 tooth back] of 6.0 micrometers, solid content coverage is the following thermofusion nature ink constituent 3.0g/m² It applied by the bar coating machine so that it might become, and it dried at 80 degrees C, the hot printing nature ink layer was formed, and the hot printing sheet of this invention was obtained.

Hot printing nature ink constituent The inorganic pearl pigment (Iriodin 300 Merck Japan, Inc.) 40 section Polyester resin (Tg67 degree C) The ten sections MEK/toluene (1:1) The 50 sections [0015] On the hot printing nature ink layer of example 2 example 1, solid content coverage is the following glue line constituent 1.0 g/m² It applied by the bar coating machine so that it might become, and the hot printing sheet of this invention was obtained like the example 1 except having dried at 65 degrees C and having formed the glue line.

Glue line constituent EVA particle emulsion (particle size of 6 micrometers, the minimum membrane formation temperature of 70 degrees C) The ten sections Carnauba wax emulsion The 40 sections IPA/water (3/1) The 50 sections [0016] Between the example 3 above-mentioned polyester film and a hot printing nature ink layer, solid content coverage is the following stratum disjunctum constituent 0.5g/m² It applied by the bar coating machine so that it might become, and the hot printing sheet of this invention was obtained like the example 2 except having dried at 65 degrees C and having formed stratum disjunctum. Stratum disjunctum constituent Carnauba wax emulsion The 20 sections IPA/water (3/1) The 80 sections [0017] The hot printing sheet of this invention was obtained like the example 2 except having changed the example 4 glue-line constituent into the following glue line constituent.

Glue line constituent Carbon black dispersion The ten sections EVA particle emulsion (particle size of 6 micrometers, the minimum membrane formation temperature of 70 degrees C) The ten sections Carnauba wax emulsion The 40 sections IPA/water (3/1) The 40 sections [0018] The hot printing sheet of this invention was obtained like the example 3 except having changed example 5 stratum disjunctum, the hot printing nature ink layer constituent, and the glue line constituent into following each ink constituent, respectively.

Stratum disjunctum constituent Paraffin wax dispersion The 50 sections Styrene butadiene latex (Tg0 degree C) The five sections IPA/water (2/1) 45 section hot printing nature ink constituent The inorganic pearl pigment (Iriodin 323 Merck Japan, Inc.) 80 section Polyester resin (Tg20 degree C) The 20 sections MEK/toluene 100 section glue line constituent Ethylene acrylic-acid-resin particle dispersion The 30 section Carnauba wax emulsion The 30 sections IPA/water (1/1) The 40 sections [0019] The hot printing sheet of this invention was obtained like the example 4 except having changed the glue line constituent of example 6 example 4 into the following glue line constituent.

Glue line constituent alpha mold copper-phthalocyanine-blue pigment dispersion liquid The 15 sections EVA particle emulsion (particle size of 7 micrometers, the minimum membrane formation temperature of 70 degrees C) The ten sections Carnauba wax emulsion The 40 sections IPA/water (3/1) The 35 sections [0020] The comparative hot printing sheet was obtained like the example 1 except having changed the example of comparison 1 hot-printing nature ink layer constituent into the following hot printing nature ink layer constituent.

Hot printing nature ink layer constituent Bronze The 70 sections Polyester resin (Tg67

degree C) The 30 sections MEK/toluene The 100 sections [0021] The comparative hot printing sheet was obtained like the example 2 except having changed the example of comparison 2 hot-printing nature ink layer constituent into the following hot printing nature ink layer constituent <TXF FR=0008 HE=010 WI=080 LX=1100 LY=0900>.

Hot printing nature ink layer constituent Bronze The 70 sections Polyester resin (Tg67 degree C) The 30 sections MEK/toluene The 100 sections [0022] The comparative hot printing sheet was obtained like the example 3 except having changed the example of comparison 3 hot-printing nature ink layer constituent into the following hot printing nature ink layer constituent.

Hot printing nature ink layer constituent Bronze The 70 sections Polyester resin (Tg67 degree C) The 30 sections MEK/toluene The 100 sections [0023] To the front face of polyester film (the Toray Industries make, lumiler) with a thickness [in which the heat-resistant slip layer was formed at example of comparison 4 tooth back] of 6.0 micrometers, solid content coverage is the following stratum disjunctum constituent and a vacuum evaporatio support layer constituent, respectively 1.0 g/m² and 0.2 g/m² It applied by the bar coating machine so that it might become, and after drying at 80 degrees C and forming stratum disjunctum and a vacuum evaporatio support layer, the metal vacuum evaporatio layer which consists of aluminum with a thickness of 600A with a vacuum deposition method was formed. Solid content coverage is the following glue line constituent on this metal vacuum evaporatio layer 2.0 g/m² It applied by the bar coating machine so that it might become, and it dried at 80 degrees C, the glue line was formed, and the comparative hot printing sheet was obtained.

Stratum disjunctum constituent Carnauba wax The 95 sections Styrene-butadiene rubber 5 section vacuum evaporatio support layer constituent Chlorination polypropylene The ten sections MEK/toluene 90 section glue line constituent EVA particle emulsion (particle size of 7 micrometers, the minimum membrane formation temperature of 70 degrees C) The ten sections Carnauba wax emulsion The 40 sections IPA/water (3/1) The 50 sections [0024] The comparative hot printing sheet was obtained like the example 4 of a comparison except having changed the example of comparison 5 vacuum-evaporatio support layer constituent into the following vacuum evaporatio support layer constituent.

Vacuum evaporatio support layer constituent Chlorination polypropylene The nine sections Yellow color The one section MEK/toluene The 90 sections [0025] In the evaluator which carried out the printing condition prototype, it printed using the thin film thermal head of 200dpi under the conditions of printing pressure [of 4kg] / 200mm width-of-face, and printing speed 10 mm/sec.

[0026]

[Table 1]

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] Drawing having shown the cross section of the hot printing sheet of this invention.

[Drawing 2] Drawing having shown the cross section of the application of the hot

printing sheet of this invention.

[Description of Notations]

1. Base Material Sheet
2. Hot Printing Nature Ink Layer
3. Stratum Disjunctum
4. Glue Line
5. Tooth-Back Layer